

Abstract

Presents a liquid crystal display device that does not require a surface orientation treatment, dramatically improves the response rate of dynamic image displays and does not experience light leaks when the display is black, which means to yield a dark field of vision. The liquid crystal display device comprises polymer-stabilized blue phase liquid crystals sandwiched between a pair of clear substrates. The liquid crystal display device obtained using polymer-stabilized blue phase liquid crystals exhibits large double refraction changes when an electrical field is applied in an in-plane direction to the cell substrates. The polymer-stabilized blue phase liquid crystal comprises a low molecular weight liquid crystal that allows a blue phase to appear between cholesteric and isotropic phases and a polymer network formed in the low molecular weight liquid crystals. Furthermore, a liquid crystal display device that does not leak light when the display is black (yields a dark field of vision) can be obtained by optimizing the type and amount of a chiral dopant added to the liquid crystals.